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(72) Inventors FRANCIS WALTER COOK and

FRANK JOSEPH WOOD

## (54) IMPROVEMENTS IN OR RELATING TO DATA HANDLING SYSTEMS

(71) We, THE PLESSEY COMPANY LIMITED, a British Company of 2/60 Vicarage Lane, Ilford, Essex, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to data handling systems and relates more particularly to optical data systems of the kind described in our British Patent Specifications Nos. 1,369,197, 1,354,103 and 1,375,963, in which data is represented in the form of a bar code which comprises a plurality of parallel, spaced apart coloured bars the width and spacing of which are arranged in accordance with a predetermined code, the coloured bars being scanned by a probe, e.g. a hand held pen like device for reading purposes. The word coloured when used herein is intended to include black and white.

25 One application that has recently been identified as suitable for using a bar code arrangement is in labelling blood samples and drugs in hospitals. A related application is in the identification of blood samples taken from animals for health checks at regular intervals. In all these cases it is important for clinical reasons to be able to correlate without any possibility of error a blood sample with the identity of the donor. Frequently such samples are enclosed in cylindrical test tubes or phials and the present invention relates to a method of identifying such test tubes or phials or other cylindrical or tubular objects using the aforementioned bar code technique.

40 According to the present invention there is provided a cylindrical or tubular object e.g. test tube, phial, etc. having printed or otherwise displayed on the curved surface thereof a bar code including a plurality of substantially parallel, spaced apart, coloured bars arranged according to a predetermined code. Conveniently the bar code may be

printed or otherwise displayed on a label which is attached to the object.

In one arrangement for carrying out the invention the bars of the bar code may be arranged substantially parallel to the axis of the object and in an alternative arrangement the bars of the bar code may be disposed substantially perpendicular to the axis of the object so as to at least partially extend around the circumference of said object and preferably so as to extend completely around the circumference of the object.

An exemplary embodiment of the invention will now be described with reference to the drawings accompanying the Provisional Specification, in which,

Figure 1, shows a test tube having a bar-coded label attached thereto,

Figures 2a and 2b, show alternative methods of reading the bar code carried by a test tube of Figure 1,

Figure 3, shows a typical label incorporating a bar code, and

Figure 4, shows a further arrangement for reading the information from the bar code carried by a test tube.

In Figure 1 there is illustrated at test tube 1 which has attached thereto a label 2 shown in more detail in Figure 3 on which is printed a bar code comprising a plurality of substantially parallel spaced apart bars 3, which extend completely around the circumference of the test tube 1. Also on the label 2 there is provided alphanumeric characters 4 in the example shown consisting of the numerals 1234 for providing a visual identification of the test tube. In Figures 2a and 2b there are shown alternative arrangements for reading out the information of the bar code displayed on the test tube of Figure 1, the arrangement of Figure 2a including a light pen 5 having a reading head 6 which is arranged in close proximity to the test tube 1, the light pen 5 being arranged to be moved relative to the test tube 1 in an axial direction such that the reading head 6 traverses the bars of the

bar code. In order to prevent the light pen skidding off the convex cylindrical surface of the test tube 1, guides 7 are provided by means of which the reading head may be located closely adjacent the surface of the test tube. The arrangement of Figure 2b is similar to that of Figure 2a except that the guides 6 are replaced by a pair of guide wheels 8.

10 In Figure 4 there is shown a further arrangement for reading the bar codes carried by test tubes such as that of Figure 1, in which a rack 9 is provided for containing a plurality of test tubes 1, the test tubes 1 being withdrawn in an axial direction from holes 10 contained in the rack. Associated with each of the holes 10 in the rack 9 is a bundle of optical fibres 11 one end of each of which is disposed alongside each of the holes 10 so as to be in radial alignment with a test tube 1 when contained in the hole 10, the outer ones of each bundle of fibres extending to a light source 12 with the inner one or ones of each bundle of fibres being fed to respective light detectors referenced D1 to D6 which provide outputs to a logic circuit 13. It may be arranged that the logic circuitry is switched to whichever sensor is operative when a 'start-of-message' signal is derived from a respective bar code.

Although in the arrangements described hereinbefore have utilised bar codes with the bars extending circumferentially around a test tube, in some applications it may be convenient to arrange the bars of the bar code to be parallel to the axis of the test tube in which case the bar codes may be read by either spinning the test tube or by moving a light pen or reading device around the circumference of the test tube.

As well as the applications already mentioned, the arrangements described may also be used in the collection of blood from donors by the blood transfusion service, the matching of blood for transfusions, and of

tissue for transplants, and similar techniques could prove valuable in connection with the identification of blood or urine specimens, fingerprints, dangerous drugs or other samples collected at the scene of a crime, and other such applications where the infallibility of identification is of legal importance. As well as being applied to test tubes and phials, the bar codes may be applied in the way described above to other similar cylindrical and tubular objects.

#### WHAT WE CLAIM IS:—

1. A cylindrical or tubular object e.g. test tube, phial, etc. having printed or otherwise displayed on the curved surface thereof a bar code including a plurality of substantially parallel, spaced apart coloured, as hereinbefore defined, bars arranged according to a predetermined code.

2. An object as claimed in claim 1, in which the bar code is printed or otherwise displayed on a label which is attached to the object.

3. An object as claimed in claim 1 or claim 2, in which the bars of the bar code are arranged substantially parallel to the axis of the object.

4. An object as claimed in claim 1 or claim 2, in which the bars of the bar code are disposed substantially perpendicular to the axis of the object so as to at least partially extend around the circumference of said object.

5. An object as claimed in claim 4, in which the bars of the bar code extend completely around the circumference of the object.

6. A cylindrical or tubular object substantially as hereinbefore described with reference to the drawings accompanying the Provisional Specification.

B. R. LAWRENCE,  
Chartered Patent Agent,  
For the Applicants.

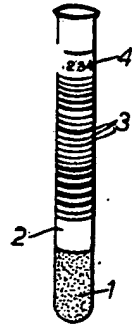
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PROVISIONAL SPECIFICATION

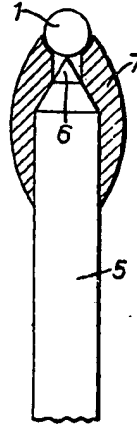
2 SHEETS

*This drawing is a reproduction of  
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Sheet 1



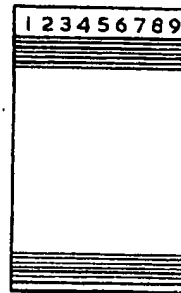
**FIG. 1.**



**FIG. 2a.**



**FIG. 2b.**



**FIG. 3.**

